

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A resonant magnetometer comprising an oscillatory member and means for passing an alternating current (AC) through said oscillatory member, characterised in that a driver is driving ~~means are~~ additionally provided to impart a magnetic field independent oscillatory force to said oscillatory member.
2. (Currently Amended) A magnetometer according to claim 1 comprising a sensor ~~sensing means~~ for providing an electrical output signal dependent on the deflection of the oscillatory member.
3. (Currently Amended) A magnetometer according to claim 2 wherein the driving ~~means~~ comprises a positive feedback circuit for receiving the electrical signal produced by the sensors ~~sensing means~~.
4. (Currently Amended) A magnetometer according to claim 3 wherein the driving ~~means~~ provides an oscillatory force of fixed amplitude.
5. (Currently Amended) A magnetometer according to claim 3 in which the driving ~~means~~ is arranged to impart an oscillatory force to the oscillatory member of adjustable amplitude, wherein the amplitude of the oscillatory force applied by the

~~driving means~~ is adjusted during use so as to maintain a given amplitude of oscillation of the oscillatory member.

6. (Currently Amended) A magnetometer according to ~~any one of claims 2 to 5~~ wherein the means for passing an AC through the oscillatory member comprises a feedback circuit arranged to receive the electrical output signal produced by the ~~sensor~~sensing means.

7. (Currently Amended) A magnetometer according to ~~any one of claims 2 to 6~~ wherein the sensor ~~sensing means~~ comprises at least one sensor electrode located on the substrate and having a variable capacitance with the oscillatory member.

8. (Currently Amended) A magnetometer according to claim 7 wherein the ~~sensing means~~ sensor comprises a plurality of elongate sensor electrodes located on the substrate and the oscillatory member comprises a plurality of elongate electrodes interdigitated with said plurality of elongate sensor electrodes.

9. (Original) A magnetometer according to claim 8 wherein the electrodes of the oscillatory member are maintained at a predetermined direct current (DC) polarisation voltage.

10. (Original) A magnetometer according to claim 8 wherein a high frequency AC polarisation voltage is applied to the electrodes of the oscillatory member.

11. (Currently Amended) A magnetometer according to ~~any one of claims 8 to 10~~ wherein said plurality of sensor electrodes are electrically connected to form two electrode sets, the two electrode sets being arranged to provide differential capacitive pick-off.

12. (Currently Amended) A magnetometer according to ~~any preceding claim 1~~ wherein the means for passing an AC through the oscillatory member includes means to vary the amplitude of said AC.

13. (Currently Amended) A magnetometer according to ~~any preceding claim 1~~ wherein the ~~driving means~~ comprises at least one drive electrode formed on the substrate to electrostatically impart the oscillatory force to the oscillatory member.

14. (Currently Amended) A magnetometer according to ~~any preceding claim 1~~ in which the ~~driving means~~ comprises a plurality of first elongate drive electrodes formed on the substrate and the oscillatory member comprises a plurality of second elongate drive electrodes, wherein the first elongate drive electrodes are interdigitated with the second elongate drive electrodes.

15. (Currently Amended) A magnetometer according to ~~any preceding claim 1~~ wherein the oscillatory member comprises a resonant beam.

16. (Currently Amended) A magnetometer according to ~~any preceding claim 1~~ wherein the oscillatory member comprises at least two flexible leg portions, said AC being passed through at least one of said at least two flexible leg portions.

17. (Original) A magnetometer according to claim 16 wherein the oscillatory member comprises a substantially rigid cross-beam arranged substantially perpendicular to, and interconnecting, said at least two leg portions.

18. (Original) A magnetometer according to claim 17 wherein the cross-beam comprises a plurality of elongate electrodes protruding perpendicularly therefrom.

19. (Currently Amended) A magnetometer according to claim 17 ~~or 18~~ wherein the means for passing an alternating current (AC) through the oscillatory member is arranged to supply a differential AC voltage to said leg portions such that said cross-beam receives the desired polarisation voltage.

20. (Currently Amended) A magnetometer according to ~~any preceding claim 1~~ wherein the oscillatory member is arranged to oscillate along an axis in a plane parallel to the plane of the substrate.

21. (Currently Amended) A magnetometer according to ~~any preceding claim 1~~ wherein the oscillatory member comprises at least one stress reliever ~~means~~.

22. (Currently Amended) A magnetometer according to claim 21 wherein the at least one stress reliever ~~means~~ comprises a stress relief loop.

23. (Currently Amended) A magnetometer according to ~~any preceding claim 1~~ wherein said magnetometer is formed as a micro-electromechanical system (MEMS).

24. (Currently Amended) A magnetometer according to ~~any preceding claim 1~~ wherein said substrate and oscillatory member comprise silicon.

25. (Original) A magnetometer according to claim 24 wherein said substrate and oscillatory member are formed from any one of a silicon-on-insulator (SOI) wafer and a silicon-on-glass (SOG) wafer.

26. (Currently Amended) An inertial measurement unit (IMU) comprising at least one magnetometer according to ~~any preceding claims 1~~.

27. (Original) An IMU according to claim 26 wherein three magnetometers are provided, each of the three magnetometers being arranged to detect magnetic fields along mutually orthogonal axes.